

2020 Pilots, Demonstrations and Assessments

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1. Introduction

The Company invests in pilots, demonstrations and assessments to research and develop new measures, solutions and programs that can be offered to customers to further energy efficiency benefits to customers. The Company continues to test new measures and solutions that were proposed in the 2019 and has proposed additional demonstrations for the 2020 plan year. The Company in 2019, as part of its commitment to innovation, has a new dedicated team called the Customer Energy Management Growth team, that oversees all innovation for energy efficiency. This new team will accelerate the process of deploying and implementing pilots, demonstrations and assessments for the Company.

The Company has a process by which it tests new ideas, as pilots, demonstrations and assessment, that follows a three-stage process. In the first stage a concept idea is researched and savings potential, scalability, customer value and preliminary benefit costs analysis is conducted to determine if the idea is viable to move forward. The next stage the idea is developed and designed along with evaluation team for implementation. The final stage the idea is deployed at customer sites, if applicable, or launched in the market and evaluated for impact and process. If the pilot demonstration or assessment is successful for customer benefits, energy savings, and is viable under least cost procurement framework, the idea is then further developed using input from evaluation learnings, for launch, as part of an existing program or launched as a new program for customers.

Based on the above stated process, pilots, demonstrations and assessments in a plan year may be modified, expanded or may be discontinued after various stages to better align with customer values, learnings from the market place and for maximizing benefits. The Company also has a pipeline of ideas it continues to research and develop as emerging opportunities for pilots, demonstrations and assessments. Some example of these ideas include, Lighting as a Service, Energy as a Service and Window Shades. The company will continue to explore these ideas as they evolve in the market place.

The evaluation pathway for pilots, demonstrations and assessments is based on each pilot, demonstration or assessment's scale, budget, scope, and the availability of external

data. The EM&V team is involved in the pilot, demonstration, and assessment design process beginning at the concept stage. This ensures design and data collection are suitable to allow for effective evaluation of the pilot, demonstration, or assessment. The EM&V team will provide guidance on determining the appropriate level of evaluation for each pilot, demonstration, and assessment.

The purpose of the evaluation is to determine impact and process learnings such that they can be used to establish a new measure, go-to market strategy or new program.

Where an evaluation is proposed for a pilot, demonstration and assessment, there can be an independent evaluation or a vendor evaluation. An independent evaluation uses a third-party evaluation vendor that has been selected following the Company's standard procurement policy. Additional details on procurement process can be found in Attachment 3. An independent evaluation can be both a process as well as an impact evaluation.

A vendor evaluation is conducted by the vendor installing a particular technology, measure, strategy or solution, or can be conducted by the Technical Assistance (TA) vendor who conducts the savings analysis for the installed technology, measure or energy saving strategy. A vendor evaluation can only be an impact evaluation.

2. Definitions

Pilots

In 2019 the Company redefined what it considers a pilot in accordance with the Docket No. 4600-A PUC Guidance Document.

Pilot definition: As defined in the Docket 4600-A Guidance Document, "A pilot is a small scale, targeted program that is limited in scope, time, and spending and is designed to test the feasibility of a future program or rate design. It is incumbent upon the proponent of a pilot to define these limits in a proposal for PUC review. Ideally, a pilot can provide net benefits and achieve goals, but the primary design and value of a pilot is to test rather than to achieve."¹

¹ Docket No. 4600-A PUC Guidance Document, October 27, 2017. Section V. Pilots.

This attachment summarizes each pilot and describes the way it advances, detracts, or remains neutral on achieving the Docket 4600 goals for the electric and gas system.

Pilots are designed to explore technologies and approaches to energy management not included in the core energy efficiency programs (Residential, Commercial and Industrial, and Multifamily).

Pilots enable the Company to test technologies, new energy management strategies, customer adoption, workforce adoption and cost effectiveness of emerging and new technologies. If a pilot is successful for commercialization, new programs and measures may be added to existing core programs.

For actions in the Plan that do not fall under the Docket 4600-A definition of pilots, the Company proposes the following definitions for demonstrations and assessments:

Demonstrations

Demonstration definition: A demonstration tests a new technology or solution that is delivered as part of an existing program where a technical analysis has estimated the savings and determined that the measure is likely to be cost effective. An example of a demonstration was beneficial electrification of heat in the HVAC program in 2018.

Assessments

Assessment definition: An Assessment tests a measure, a bundle of measures, or a solution, that can be delivered as part of an existing program where the savings are not known but will be explored as part of the Assessment, through an independent evaluation or a vendor evaluation. The scope of evaluation for an Assessment depends on the specifics of the Assessment. Assessments are not included in the calculation of the Shareholder Incentive. An example of an assessment would be Automated Window Shades in the C&I retrofit program.

Table 1. Definitions: Pilots, Demonstrations and Assessments						
	Part of existing program	Cost effective savings information	Potential for scalability	Vendor or Independent Evaluation	Savings contribution to shareholder incentive	Cost recovery from SBC
Pilot	No	Unknown or limited	Independent Program	Can be vendor or independent evaluation, based on scale, budget, scope, and the availability of savings and benefits data	No	Yes
Demonstration	Yes	Estimated savings	Part of existing program		Yes	Yes
Assessment	Yes	Unknown or limited	Part of existing program		No	Yes

3. Summary of Commercial, Industrial and Residential Pilots Demonstrations and Assessments

The following pilots’ demonstrations and assessments are proposed for 2020 in the Residential, Commercial and Industrial, and Multifamily sectors.

Table 2. Commercial and Industrial Pilots, Demonstrations and Assessments								
Classification	S.N.	Fuel	Name	C&I Programs	Duration	Budget	Savings Estimation	Evaluation
Pilots								
Active Demand Response	1	Gas	Gas DR Pilot	N/A	2018-2020	\$ 366,015	78.5 DTherms peak hour	Vendor Evaluation
Net Zero	2	Elec.	Pathway to Zero Energy Buildings	N/A	2018-2020	\$ 106,269	Unknown	Vendor Evaluation
Demonstrations								
Industrial	1	Elec.	Underutilized EE tech. on mechanical power transmission systems	C&I Retrofit	2018-2020	\$ 251,693	75 MWh	Vendor Evaluation
	2	Dual	SEM	C&I Retrofit	2018-2020	\$ 622,000	1700 MWh 5410 Therms	Independent Evaluation
HVAC Tech.	3	Dual	HVAC Lighting Controls Plus	C&I Retrofit	2020	\$ 356,269	1.8 kWh/SF (approx.). Negligible gas savings	Vendor Evaluation
	4	Dual	Kitchen Exhaust	C&I Retrofit	2020	\$ 28,269	65 MWh 21,000 Therms	Vendor Evaluation
	5	Dual	Absorption Air Cleaning	C&I Retrofit	2020	\$ 256,269	0.453 kWh/SF 0.07 Therms/SF	Vendor Evaluation
	6	Gas	Gas Heat Pumps	C&I Retrofit	2020	\$ 27,269	Unknown	No Evaluation
	7	Elec.	Heat Pumps	C&I Retrofit	2019-2020	\$ 359,293	30 MWh	Independent Evaluation
New Construction	8	Dual	Performance based Procurement (Accelerate Performance)	C&I New Construction	2018-2020	\$ 38,845	3 kWh per SF(approx.)	Vendor Evaluation
Innovation	9	Gas	Innovative Gas	C&I Retrofit	2020	\$ 100,000	Unknown	No Evaluation
	10	Elec.	Innovative Electric	C&I Retrofit	2020	\$ 100,000	Unknown	No Evaluation
Assessments								
Lighting	1	Elec.	Emerging Lighting Market Interventions Secure Lighting Spec (SLS)	C&I New Construction	2018-2020	\$ 43,897	Unknown	No Evaluation

Note: Budgets indicated in this table include, evaluation, incentives, program administration, sales, marketing, technical assistance and training (if applicable)

5. 3. Summary of Commercial, Industrial and Residential Pilots Demonstrations and Assessments

Table 3. Residential Pilots								
	S.N.		Name	Residential Program	Duration	Budget	Savings Estimation	Evaluation
Pilots								
Net Zero	1	Elec.	Pathway to Zero Energy Homes Pilot	N/A	2018-2020	\$ 287,846	Unknown	Vendor Evaluation
Assessments								
Behavioral	2	Gas	Home Energy Score Evaluation	Energy Wise	2020	\$ 10,000	Unknown	Independent Evaluation

Note: Budgets indicated in this table include, evaluation, incentives, program administration, sales, marketing, technical assistance and training (if applicable)

4. Commercial and Industrial Pilots, Demonstrations and Assessments

4.1 Commercial and Industrial Pilots

The Company will continue with the two C&I pilots for 2020 listed below:

Table 4. Summary Commercial and Industrial Pilots					
	Name	Goals and Scope	Duration	2020 Budget	2020 Savings
1	Pathway to Zero Energy Buildings	To advance interest in Zero Energy Buildings in Rhode Island with education and awareness, training and marketing and launching two new Zero Energy Building (ZEB) pilot projects in the 2019-2020 timeframe and test zero energy design, operation and collect customer feedback from building owner, designer and occupants. The goal is to inform the design of a	2018-2020	\$106,629	Not determined

		Zero Energy Building Program in 2021-2023			
2.	Gas DR Pilot	Reduce gas demand with large commercial customers during the winter season, with an expanded gas demand response offering in conjunction with existing peak period demand response offering offered in the winter of 2019-2020 and 2020-2021	2019 - 2020 and 2020-2021 winter	\$366,015	42.5 DTherms hourly peak reduction (2019-2020)

a. Pathway to Zero Energy Buildings

i. **Overview:** In 2018 National Grid initiated a Zero Energy Building (ZEB) pilot for commercial buildings to advance interest in the RI building industry for ZEB’s and a path to zero energy. To accelerate these efforts National Grid will continue to focus on four areas, a) education and awareness, b) marketing, c) training and d) supporting ZEB projects with technical assistance, incentives, commissioning and documentation, to advance ZEB’s in 2020.

ii. **Customer segment addressed:** Large and small commercial buildings above 30,000 SF are eligible for this pilot.

iii. **Pilot Delivery:**

- Education and awareness: This include educational Forums and Seminars on a bi-annual basis that provide education and information specific to achieving low Energy Use Intensity (EUI) targets in commercial buildings as a pathway to Zero Energy Buildings. These educational Forums and Seminars will be coordinated with the residential Zero Energy Building efforts as there are overlaps with projects like multifamily and with the design and building community at large. The Company plans to develop a website dedicated to information to ZEB design and engineering to achieve ZEB goals, that will be launched in early 2020.
- Marketing: Providing case studies and information on Zero Energy Building strategies for the building industry and owners and developers via various channels, including online and via newsletters.

- Training: Providing training and access to trainings for building industry professionals and contractors.
- Zero Energy Building projects: Identifying projects with owners, developers and architects that can achieve Zero Energy targets and providing technical expertise, financial incentives, commissioning and post occupancy verification for these projects, as a way to learn and help design and launch a full Zero Energy Building program in the future.

iv. Incentive structure for projects: Incentives will include, funding design charette workshops, technical assistance for design development, funding an owner representative for all stages of design and construction, commissioning of the project and incentivizing documentation and certification of Zero Energy registration.

v. Evaluation: ZEB projects will target an EUI that is developed for the building type along with the owner. The evaluation for ZEB project will be based on achieving the EUI goals and on documenting the performance of the building to achieve net zero energy consumption, in the first year. The evaluation for ZEB projects will be conducted by a vendor engaged to support the project with technical assistance.

vi. Changes in 2020: Early market assessment conducted by National Grid sales team and strategy team in 2018 indicated that there is interest in the market for ZEB multifamily projects, higher education as well as a potential for K-12 school projects. In 2020 there is a potential for ZEB schools in Rhode Island and the Company will pursue and support these projects under the State SEMP agreement. 2018 the Company developed criteria for Zero Energy projects to solicit project partnerships with owners, developers and architects and will continue these efforts to identify projects in 2020. The Company proposes to enhance its website for ZEB offerings in 2020.

Table 5: Docket 4600 Goals - Pathway to Zero Energy Buildings Pilot	
4600 Goals for Electric System	Advances/Detracts/Neutral
Provide reliable, safe, clean, and affordable energy to Rhode Island customers over the long term (this applies to all energy use, not just regulated fuels).	Advances low energy use buildings and clean energy with renewables on site. Provides bill reduction and therefore operational savings due to higher energy efficiency coupled with renewables on site.

	<p>Provides healthier buildings that are more comfortable.</p> <p>Improvements in customer empowerment and choice</p>
<p>Strengthen the Rhode Island economy, support economic competitiveness, retain and create jobs by optimizing the benefits of a modern grid and attaining appropriate rate design structures.</p>	<p>This pilot has the potential to provide new local job opportunities through the construction activities and on-going site maintenance.</p> <p>Participating in, and acknowledgement of, these programs increases awareness of job opportunities in emerging and sustainable energy sources, which can generate interest in these jobs and create future local jobs in these areas.</p> <p>Creates high performing environments that boost economic growth</p>
<p>Address the challenge of climate change and other forms of pollution.</p>	<p>Pilot advances carbon savings with energy efficiency and renewable energy.</p>
<p>Prioritize and facilitate increasing customer investment in their facilities (efficiency, distributed generation, storage, responsive demand, and the electrification of vehicles and heating) where that investment provides recognizable net benefits.</p>	<p>Investments in Zero Energy Buildings create more value for building owners</p>
<p>Appropriately compensate distributed energy resources for the value they provide to the electricity system, customers, and society.</p>	<p>Neutral – this pilot is neutral on this goal. The Company will explore customer compensation for the locational benefits to the system as ZEB market scale and emerges.</p>

Appropriately charge customers for the cost they impose on the grid.	The current ZEB pilot will not disproportionately impact the grid at the moment. At scale ZEB’s have the potential to disproportionately impact (cost) customers who do not have renewables on site. This Company will explore impacts as this market emerges.
Appropriately compensate the distribution utility for the services it provides.	Neutral – this pilot is neutral on this goal.
Align distribution utility, customer, and policy objectives and interests through the regulatory framework, including rate design, cost recovery, and incentive.	This pilot advances this goal by putting incentives towards energy efficiency measures and solutions that helps to achieve the GHG reduction goals of the Resilient Rhode Island Act of 2014 and the Rhode Island GHG Emissions Reduction Plan of 2016.

b. Gas Demand Response

Overview: The Company has been utilizing electric Demand Response (DR) to address grid constraints and help provide reliable service to our customers. Until recently, DR offerings for customers were limited to the electric market. The Company is currently testing gas DR projects in its NY territory, conducting a study of the potential for gas demand response in MA with Fraunhofer Center for Sustainable Energy, and laying the groundwork for a pilot in RI. Additionally, during the winter of 2018-2019, the Company launched a Peak Period Gas Demand Response (PPDR) pilot project, that rewards customers for shifting their usage outside of the peak-period of the gas system (6AM-9AM from November 1st to March 31st). This program works well for commercial and industrial customers who have intra-day flexibility of their natural gas usage. Customers in this program would be able to provide their demand reduction via either fuel-switching or demand control (e.g. thermostat setback). The Company currently has a single C&I customer enrolled in this program. However the Company believes that a number of proposed changes to the program, as outlined below, are likely to lead to increased participation among other candidate customers in RI.

With gas DR the Company will test distribution system benefits, reduction of gas system peak demand via a reduction in overall natural gas consumption, customer adoption of gas DR and incentive levels to drive participation. An in-depth study, Gas Peak Demand Savings, will get underway in 2020 and will quantify winter demand benefits. Testing Gas DR will allow the Company to understand the impact on gas and electric systems and whether National Grid's role in the market influencing market rates of adoption.

The Company plans to target achieving 42.5 DTh of hourly peak reduction in the winter of 2019 – 2020, with the below stated DR offerings. The Company believes that the majority of these peak reduction savings will come from customers participating in the full day ("Extended") demand response program, while the remainder of them coming from customers participating in peak period demand response program. These demand reduction programs are described in detail in sections below. This above stated target is dependent on enrollment levels and setting an appropriate incentive level to drive participation. Since 2019-2020 will be the second year of this pilot, the budget for this pilot is an estimation based on the Company's current understanding of the customer base and market drivers that will move customers to participate in the next two DR seasons. (i.e. the winter of 2019-2020 and 2020-2021, each of which spans Energy Efficiency Plan Years)

Customer segment addressed: The gas DR pilot is focused on large, firm commercial and industrial customers, specifically those that have gas equipment that can be curtailed without creating an unsafe environment. The goal of the project is to test the following:

- Are customers interested in participating in an incentivized Gas Demand Response program?
- If so, what are the acceptable price point values by customer SIC code and equipment type?
- What are the distribution system benefits?
- What is the scalability of the program?

Pilot Delivery: The gas DR pilot involves the installation of data recording hardware that provides granular usage data for participating customers. Data from the pilot will be evaluated each year, and a summary report being produced in 2020 and 2021. In the winter of 2018-2019 four Gas DR events were called and an average peak hour reduction of 18 DTh was achieved.

Peak-Period Demand Response (PPDR): In 2019- 2020 the Company will expand participation in PPDR. Many program terms will remain similar to the terms of the pilot launched during the winter of 2018-2019:

- Limits will exist to the number of events that National Grid can call during a given winter.
- Customer participation in this program and the called events will be compensated via direct incentive payments, not in the form of a reduced rate.
- While enrolled customer participation in called events will be mandatory, this participation will be enforced through contractual structures and financial penalties – National Grid will not maintain a unilateral right to disrupt gas service to participating customers during called events.

Incentive structure: In a change from winter 2018-2019 program terms, customer compensation for participation in the PPDR program will be based on a combination of ‘availability’ and ‘energy’ payments. Each of these rates will be standard offers to all customers, though customer earning opportunity will vary based on the volume of peak hour Dth reduction that each customer can commit to and deliver.

Extended Demand Response (EDR): For the winter of 2019-2020 the Company is in the process of developing an offering for an Extended Demand Response pilot program, which will provide a meaningful reduction in the peak load requirement in the system. The Extended Demand Response program will reward those customers who have inter-day flexibility of their natural gas usage, or the existing ability to switch their heating fuel from natural gas to another fuel source for a full day period.

The basic parameters of this program would match those of the peak period program, customers in the extended program would only be allowed to provide their demand reduction either via fuel-switching or via an arrangement where National Grid maintains control over their equipment and could ensure demand reduction. The duration of each event would be a minimum of 24 hours (6AM on day 1 until 6AM on day 2, Nov. 1st through March 31st). Limitations will also be put in place that will limit the number of consecutive days on which any individual customer could be called to participate in the extended demand response program. National Grid will have the right to call up to 6 events during the winter at the stated incentive rate.

The EDR program will provide incentives for customers who can shift their usage outside of a given day by switching to an alternative source (most typically fuel oil) to meet their energy needs.

Incentive Structure: Customer compensation for participation in the EDR program will be based on the same combination of ‘availability’ and ‘energy’ payments outlined in the PPDR program description. Each of these rates will be standard offers to all customers, though customer earning opportunity will vary based on the volume of peak hour DTh reduction that each customer can commit to and deliver.

Evaluation: Initial benefit cost analysis indicates that the Peak Period Demand Response program has a pathway to being cost effective. A more detailed analysis will be conducted in 2020 to determine results and inform the 2021-2023 Energy Efficiency Plan.

The gas DR pilot will be evaluated for benefits to the customer and the distribution system and to determine if it has a pathway to be cost effective at scale. Due to the small number of customers targeted by this pilot, this evaluation will be performed by the vendor, with oversight from the Company’s EM&V team.

Changes in 2020: The Gas Peak Period Demand Response (PPDR) pilot will continue in the winter of 2019-2020, with modifications and an expanded launch of an additional Gas DR pilot offering, called Extended Demand Response (EDR). The Company has proposed changes to the existing program to increase participation in Gas DR. The proposed changes include revisions to the incentive structure whereby customers receive a performance incentive and a capacity incentive. The Company also plans targeted outreach to customers with refined marketing materials that reflect customer benefits.

Table 6: Docket 4600 Goals - Gas Demand Response	
4600 Goals for Gas distribution System	Advances/Detracts/Neutral
Provide reliable, safe, clean, and affordable energy to Rhode Island customers over the long term (this	DR has the potential for many value streams, such as alleviating local distribution system constraints, increasing system flexibility, potentially delaying infrastructure

applies to all energy use, not just regulated fuels).	reinforcement projects, and providing a revenue stream for participants.
Strengthen the Rhode Island economy, support economic competitiveness, retain and create jobs by optimizing the benefits of a modern grid and attaining appropriate rate design structures.	DR has the potential for many value streams, such as alleviating local distribution system constraints, increasing system flexibility, potentially delaying infrastructure reinforcement projects, and providing a revenue stream for participants that would support economic growth.
Address the challenge of climate change and other forms of pollution.	While demand response does not directly address climate change, the additional insight into usage due to the increased data resolution provided to participants may create an opportunity for additional energy efficiency projects. Additionally, there may be a reduction in carbon due to participation in DR events.
Prioritize and facilitate increasing customer investment in their facilities (efficiency, distributed generation, storage, responsive demand, and the electrification of vehicles and heating) where that investment provides recognizable net benefits.	Neutral
Appropriately compensate distributed energy resources for the value they provide to the gas system, customers, and society.	Neutral – this pilot is neutral on this goal.
Appropriately charge customers for the cost they impose on the grid.	Neutral – this pilot is neutral on this goal.
Appropriately compensate the distribution utility for the services it provides.	Neutral – this pilot is neutral on this goal.
Align distribution utility, customer, and policy objectives and interests	Gas DR pilot advances this goal by putting incentives towards peak reduction on the gas

<p>through the regulatory framework, including rate design, cost recovery, and incentive.</p>	<p>distribution network that helps to achieve the GHG reduction goals of the Resilient Rhode Island Act of 2014 and the Rhode Island GHG Emissions Reduction Plan of 2016.</p> <p>There is also an alignment in the sense that customer participation could affect system planning, which could have a larger financial impact for all customers. In this way, participants are incentivized for providing the behavior that matches the goals of the company.</p>
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4.2 Commercial and Industrial Demonstrations

In 2020 the National Grid C&I team will continue to focus on new lighting technologies and lighting go-to-market strategies, industrial technologies and go-to-market approaches, new construction demonstrations as well as demand response demonstrations.

a. Performance Based Procurement (Accelerate Performance)

Overview: Performance based procurement is a commercial new construction program enhancement that encourages building owners and developers to specify energy performance targets and include them in the project request for proposals. The design and construction teams are selected based on their ability to meet energy performance targets. Performance-based procurement holds teams contractually accountable throughout design and into occupancy, resulting in actual performance and verifiable energy savings.

Performance based procurement results in deep, fully realized energy savings beyond prescriptive code minimums. This increases value to the building owner and delivers greater savings to the new construction sector, where advancing energy codes and standards make energy savings goal achievement more challenging.

Customer Segment Addressed: New construction building owner and developers.
Projects over 50,000 SF

Demonstration Delivery

Value to Customers:

- Technical assistance to establish project energy requirements and evaluate team submittals.
- Procurement language that integrates building performance into existing RFP and contract documents.
- Easy-to-use processes from RFP through building operations.
- Connection to financial incentives, On-Bill Repayment (OBR) and Commercial property Assessed Clean Energy (C-PACE), including incentives based on post-construction measured energy performance.
- Training and resources that allow owners to replicate this approach across a portfolio of buildings.

Incentive Structure: In addition to the technical assistance and design process assistance stated above, incentives for projects will be aligned with incentives provided under the New Construction program.

Evaluation: Measurement and verification of savings is conducted for projects as per the process followed for New Construction Program projects, where a TA vendor verifies savings post construction, with guidance and oversight from the Company EM&V team.

Changes in 2020: This demonstration was launched in 2018, with sales engagement efforts that were conducted in 2019. These efforts have not yet resulted in acquiring appropriate project to conduct this demonstration. The Company has committed dedicated sales resources for this demonstration to acquire projects in 2019 and 2020. Additional training for the Company sales team will be provided in 2020 along with a guide that will assist the sales team in Performance Based Procurement process with customers. The Company will continue with this demonstration in 2020 and look to scope three projects for implementation.

b. Underutilized Energy Efficiency Technologies on Mechanical Power Transmission Systems

Overview: Objective is to investigate adoption of higher efficiency belt and gear reduction drives associated with various types of machinery used in commercial and industrial facilities, such as belt drives on fans, pumps, production machinery, and other mechanical equipment. Another area of opportunity is replacement of low-cost worm gear drives commonly incorporated as part of OEM equipment such as conveyors, material handling equipment, and as sub systems of major machinery. OEM equipment suppliers typically incorporate low cost components and systems with lower mechanical efficiency into their products. This demonstration will attempt to promote cost effective retrofit of higher efficiency components and systems into these products or assemblies. Hopefully over the medium to longer term, this initiative could lead to an upstream incentive program targeting OEM markets.

Customer Segment Addressed: Large commercial and industrial facilities, where turbines and motors are used to produce rotational mechanical motion to perform different kind of tasks.

Demonstration Delivery: Upgrading conventional v-belt drives to notched or synchronous belt drives with higher efficiency can result in efficiency improvement ranging from 1-3%. The incremental cost associated with this upgrade is more than offset by energy savings over the life of the equipment. The Company will look to deploy this technology in three customer sites.

Changes in 2020: While this initiative started in 2018, the Company is still in the process of screening the demonstration for measure scalability, benefit cost and savings potential. If this demonstration screens for the above stated criteria it will move to the next stage in 2020 and we will look to install technology on customer sites to evaluate this demonstration.

Incentive Structure: For the demonstration the Company will do a 50 percent cost share for equipment and installation. Incentives for the scaled solution will be determined

Evaluation: Installation vendor will perform verification of savings. Design of evaluation process will be conducted with oversight from Company EM&V team.

c. Strategic Energy Management (SEM)/Continuous Energy Improvement (CEI)

Overview: Strategic energy management (SEM) is a set of processes for business energy management. The main goal of SEM is to activate industrial and manufacturing customers, through a multiplicity of interventions including individual and group coaching, to address O&M measures in the short term, pursue capital measures in the medium term and establish a culture of continuous improvement in its energy performance over a longer-term period. This last part is of critical importance in this initiative that we are testing.

Customer Segment Addressed: Manufacturing and waste water customer

Demonstration Delivery: The Company and its vendor only worked with customers who named an Energy Champion and where there is clear executive support.

Savings are derived from a site-specific regression model that considers the host of factors that may influence energy use within a facility. While an increase in capital measures is a frequent and desirable outcome of the SEM process, it is excluded from the ultimate savings reported by the initiative.

In 2019, National Grid and its implementation partner Cascade Energy recruited 9 sites to participate in the SEM demonstration. In addition, there are 4 wastewater sites from Rhode Island, who are participating in the Massachusetts mixed manufacturing and wastewater SEM cohort. The energy models were developed over the summer of 2019. Three workshops have been held along with numerous activities such as energy treasure hunts, where teams walk around buildings looking for quick ways to save energy. Customer participation has been consistent and enthusiastic. The Company plans to claim electric and gas savings in Q2 2020.

Incentive structure: Incentives are paid for performance. The incentive amount is \$0.03 per kWh saved and \$0.30 per therm.

Evaluation: Independent evaluation will be conducted in 2020 for this demonstration, with oversight, on process and data, from the Company EM&V team.

Changes in 2020: In 2020, the Company will continue the cohort workshops ensure that the program produces savings that are expected based on examples from other

jurisdictions. If these savings materialize and are determined to contribute positively to least-cost procurement, the company may launch another cohort in 2021.

d. HVAC Lighting Controls Plus

Overview: Comprehensive Network Lighting Control Plus (NLC+) go beyond traditional advanced lighting controls, which themselves represent nearly half of the remaining lighting energy savings potential according to the US Department of Energy. NLC+ systems have the hardware and software capabilities to act as a simple stand-alone energy management system or to interface seamlessly into more sophisticated existing building systems. In either case the very local and granular occupancy and other sensing data from the NLC+ system facilitates additional savings from HVAC, plug loads, and complete energy management. The resulting architecture and data also create a wide variety of non-energy benefits (NEBs) and IoT use cases including improved space utilization, enhanced security, improved occupant comfort and productivity, demand response capabilities, and reduced maintenance.

Customer Segment Addressed: Initial customer segment to be considered for this analysis are Offices, Schools/Universities, Industrial, Retail and Hospitals.

Delivery: The Company will explore and advance a more holistic approach to controls projects, addressing multiple end uses beyond lighting. To be successful, these holistic projects will need to capture the full value of all energy and non-energy benefits. This demonstration directly explores the following parameters to inform the Company's retrofit and new construction programs.

- Review available data on commercial building characteristics energy consumption in National Grid RI territory to understand how they are segmented. This review will use Commercial Building Energy Consumption Survey (CBECS) and other possible national databases/studies. Based on the measure package analysis results and building segmentation, conduct technical and market potential of these measures in National Grid territories of RI.
- Assess the capabilities of the most comprehensive NLC+ platforms available
- Test the full feasibility and value from all energy and non-energy benefit streams, including measuring energy and demand impacts, and quantifying NEB value
- Use these benefits to propose an optimal initiative design for NLC+

Incentive Structure: To be determined after initial research.

Evaluation: Vendor evaluation with oversight on data and process from the Company EM&V team.

Changes in 2020: NCL+ is a new proposed demonstration in 2020

e. Kitchen Exhaust

Overview: The goal of this demonstration is to implement a package of kitchen exhaust controls which significantly reduce the amount of exhaust and required make up air. Recommended strategies to include in a package are electrostatic filtration, demand-controlled ventilation and operator behavior change.

This demonstration project will develop and quantify three potential strategies to reduce energy use in commercial kitchen exhaust systems. Strategies to be studied are: electrostatic filtration, behavior-change campaigns, and demand control ventilation. Electrostatic filtration and the behavior-change campaign are very new measures and will be field tested.

Customer Segment Addressed: Restaurants and commercial kitchens that use kitchen exhausts.

Delivery: Customer segment targeted with this measure are commercial kitchens (found in restaurants, grocery stores, residence halls, offices, etc).

The goals are to test the savings potential of all three strategies and if viable integrate into programs as a prescriptive measure.

Incentive Structure: Incentive structure for this measure to be determined.

Evaluation: Vendor evaluation with oversight on data and process from the Company EM&V team.

Changes in 2020: This is a new demonstration in 2020

f. Air Absorption Cleaning Technology

Overview: enVerid HVAC Load Reduction (HLR) technology is a new adsorbent air cleaning technology to clean indoor air rather than bringing in fresh air and conditioning it. The

HLR model actively manages HVAC cooling and heating load within a space and also manages indoor air quality. Potential benefits are load reduction from heating and cooling. This technology also claims to reduce maintenance of HVAC system and the load for outside air resulting in the ability to reduce the size and capacity of new HVAC system.

Customer Segment Addressed:

Typical HVAC system desirable for this demonstration will be:

- A building type, such as variable air volume, single-zone rooftop unit, or dedicated outdoor air system
- Be medium or large in size (in terms of airflow)
- Have at least 20 percent outside air that is not used solely for makeup of exhaust
- Be in a common building type such as office, retail, public assembly, education, or health care
- Have a building automation system (BAS)

Demonstration Delivery: The Company will test this technology in one or two customer sites and determine savings, customer benefits and integration into existing systems, as well as develop materials to educate contractors, owners and trade allies on technology and its benefits, if the technology is viable for customer and saving benefits.

The application of this technology is for large commercial customers. This technology could potentially be a custom or prescriptive offering within the energy efficiency programs.

Incentive Structure: TBD

Evaluation: Research vendor conducting this study will conduct an evaluation with oversight of data collection and evaluation design from the Company EM&V team.

Changes in 2020: This is a new demonstration in 2020.

g. Gas Heat Pumps

Overview: Gas Heat Pumps are a technology that, manufacturers of this product state, can be twice as efficient than conventional boilers resulting in fuel savings. Gas Heat Pumps are ideal for facilities with simultaneous need for heating and cooling including, athletic facilities, pools, food and beverage processing plants, hotels and multi-unit residential buildings. For this demonstration the Company will target existing gas customers for this technology, if concept stage research indicates this is a viable technology for customer benefits and gas savings. The longer-term strategy will be to present this technology as an option for customers along with electric options, if applicable.

Customer Segment Addressed: Large commercial customer with existing conventional boiler.

Demonstration Delivery: For this demonstration, the Company will research facilities that have installed this technology for savings and barriers to adoption. Additionally, the Company will explore the potential to install this technology on customer sites to determine savings from traditional gas options as well as benefits compared to electric options.

Incentive Structure: TBD

Evaluation: TBD

Changes in 2020: This is a new demonstration in 2020

h. Small Business Heat Pump

Overview: The company in 2019 is exploring a go-to market strategy for cold climate heat pumps for small business customers who heat using oil, propane and electric resistance heat. The Company hopes to learn about incentives needed to move small business customers, technical assistance needed, market education, including barriers to adoption, the customer value proposition and non-energy benefits associated with installation and operation of cold climate heat pumps. The Company will include audits and weatherization for customer sites as part of this installation. Savings claimed from heat pumps will include electric savings as well as heating savings for full or partial fuel displacement.

Customer Segment Addressed: Small business customers like restaurants, lodging facilities, multifamily low-rise buildings and office buildings.

Demonstration Delivery: TBD

Incentive Structure: TBD

Evaluation: Independent evaluation vendor will be engaged for process and impact evaluation with data and design oversight of the evaluation from the National Grid EM&V team.

Changes in 2020: In 2020 the company will look to collate learnings, market findings, need for education and marketing to customers, contractors and other market enablers to develop a scaled solution for heat pumps based on the learnings from the 2019 demonstration. The company will look to deploy an additional 30 heat pumps based on the solution development and explore a scaled solution in the next Energy Efficiency three-year plan for Rhode Island.

4.3 Commercial and Industrial Assessments

a. Secure Light Spec (SLS)

Overview: SLS is a partnership with Lighting Manufacturer Reps (LMR) through software integrated into their quotes system to incorporate utility incentives. SLS goal is to increase projects participating in energy efficiency programs and capture savings. Manufacturer Representatives (LMR) to engineer and deliver lighting & controls packages that exceed energy code or Industry Standard Practice (ISP), whichever is higher, by 25% or more.

Customer Segment Addressed: All types of lighting projects.

Assessment Delivery: The goals of the Secure Lighting Spec are the following.

- a. Establish a special partnership between National Grid and Lighting Manufacturers Representatives (LMR) to participate in targeted code-based lighting incentive programs.
- b. Utilize the LMR application engineers to implement best practice lighting design and photometric modeling for deep energy savings and qualitative lighting

outcomes for the Company’s customers and building occupants, while meeting IES standards.

- c. Achieve substantial energy savings by utilizing the lighting engineering capabilities of the LMR. Savings are based on projects achieving 25% or greater energy savings beyond what is required by the energy code.
- d. Incorporate energy efficiency incentive estimates early in project quotes to clients & customers through the LMR pre-approved product portfolio.
- e. Reduce the lighting system initial costs through advanced lighting engineering, energy efficiency incentives and operating costs for customers and clients for projects that meet energy efficiency goals.

Incentive Structure:

Evaluation: No evaluation is proposed for this assessment. Uptake of projects from LMR will be monitored.

Changes in 2020: This demonstration was proposed in 2018 and will continue in 2020. In 2019 two potential vendors were identified and the Company will continue to work with them on an EE interface that integrates with the LMR quotes software.

5. Residential Pilots and Assessments

5.1 Residential Pilots

a. Pathway to Zero Energy Homes

In 2020 the Residential New Construction Team will focus on building the zero-energy ready and Passive House markets in Rhode Island. The pilot began in 2018 and will continue into 2020 in an effort to develop professional expertise, test the effectiveness of enhanced incentives, and test the energy efficiency of projects that achieve zero-energy ready or Passive House certification.

Table 7: Residential Pilots					
	Name	Goals and Scope	Duration	2020 Budget	2020 Savings
1	Pathway to Zero Energy	Provide enhanced incentives to projects that achieve zero	2018-2020	\$186,850	Not determined

	Homes Pilot	energy ready or Passive House homes. Continue to support the professional development of the RI building community to become certified zero-energy and/or Passive House certified builders. Test zero energy design and operation and collect customer feedback from project team and occupants. The goal is to inform the design of a Zero Energy Building Program in 2020-2021			
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In 2018, the Company initiated the Zero Energy Homes Pilot to help to accelerate the zero energy market in Rhode Island. This pilot will continue into 2020 in order to build upon the following four main market segments:

1. Education and Awareness
 - a. Stakeholder Forums
 - b. Communications
 - c. Tours
 - d. Home Show
2. Workforce Development
 - a. Zero Energy and Passive House Training
 - b. Marketing
 - c. Project Certification
3. Project Incentives
 - a. Components to get to zero energy ready
4. Marketing
 - a. Zero Energy in RI – case studies

This pilot intends on funding these segments to test the following:

5. Residential Pilots and Assessments

1. If there will be an increase in zero energy homes as a result of increased number and promotion of trained professionals
2. If there will be additional savings from high efficiency homes plus one of the proposed pathways to zero energy.

Table 8: Docket 4600 Goal - Pathway to Zero Energy Buildings Pilot	
4600 Goals for Electric System	Advances/Detracts/Neutral
<p>Provide reliable, safe, clean, and affordable energy to Rhode Island customers over the long term (this applies to all energy use, not just regulated fuels).</p>	<p>Advances low energy use new construction and major renovations and creates the infrastructure for all-electric homes and on-site renewables.</p> <p>Provides bill reduction compared to baseline new construction homes and therefore operational savings due to higher energy efficiency coupled with renewables on site.</p> <p>Provides healthier buildings that are more comfortable.</p> <p>Improvements in customer empowerment and choice</p>
<p>Strengthen the Rhode Island economy, support economic competitiveness, retain and create jobs by optimizing the benefits of a modern grid and attaining appropriate rate design structures.</p>	<p>This pilot has the potential to increase the professional capabilities of the RI residential home building industry.</p> <p>The program will support the advancement of rate design structures by incentivizing all electric homes as well as smart homes.</p> <p>The Program will be marketed through home tours, webinars, mail/email communication, the RI Home Show and collaboration with RI residential industries.</p> <p>Creates high performing environments that boost economic growth</p>

<p>Address the challenge of climate change and other forms of pollution.</p>	<p>Pilot promotes carbon savings via all electric homes and building in the infrastructure for electric vehicles (EVs) and photovoltaic energy (PV).</p>
<p>Prioritize and facilitate increasing customer investment in their facilities (efficiency, distributed generation, storage, responsive demand, and the electrification of vehicles and heating) where that investment provides recognizable net benefits.</p>	<p>This Program will facilitate the investment in a zero energy home based on the additional technical design and construction assistance and additional incentives. A zero energy home will also be the foundation for a smart home with innovative technologies for full automation. It will serve the needs of those who want the least amount of reliance on the grid, who want to reduce their carbon footprint and who want to be leaders in the fast paced technology and automation trends.</p>
<p>Appropriately compensate distributed energy resources for the value they provide to the electricity system, customers, and society.</p>	<p>Neutral – this pilot is neutral on this goal. The Company will explore customer compensation for the locational benefits to the system as ZEB market scale and emerges.</p>
<p>Appropriately charge customers for the cost they impose on the grid.</p>	<p>The current ZEB pilot will not disproportionately impact the grid at the moment. At scale ZEB’s have the potential to disproportionately impact (cost) customers who do not have renewables on site. This Company will explore impacts as this market emerges.</p>
<p>Appropriately compensate the distribution utility for the services it provides.</p>	<p>Neutral – this pilot is neutral on this goal.</p>
<p>Align distribution utility, customer, and policy objectives and interests through the regulatory framework, including rate design, cost recovery, and incentive.</p>	<p>This pilot advances this goal by putting incentives towards energy efficiency measures and solutions that helps to achieve the GHG reduction goals of the Resilient Rhode Island Act of 2014 and the Rhode Island GHG Emissions Reduction Plan of 2016.</p>

5.2 Residential Assessments

a. Residential Home Energy Score Assessment

Overview: The company in 2018 and 2019 completed 150 U.S. Department of Energy Home Energy Score assessments through the EnergyWise program.

Customer Segment Addressed: Residential gas customers.

Assessment Delivery: Assessment is completed.

Incentive Structure: Customers received the same incentives available to all EnergyWise participants.

Evaluation: In 2020, the EnergyWise program will have an impact and process evaluation conducted by an Independent evaluation with data and design oversight of the evaluation from the National Grid EM&V team. The Home Energy Score evaluation will be one component of the overall EnergyWise evaluation.

Changes in 2020: Evaluation results will inform program design.